

discharge including a gas-C, the gas-C comprising a Gas-A molecule including essentially hydrogen as an element and a Gas-B including essentially a halide; wherein said plasma discharge is substantially free from an oxygen bearing species; and wherein the Gas B is selected from hydrogen chloride or hydrogen bromide; wherein Gas C comprises a flow rate defined as a ratio of an amount of hydrogen in Gas-B to that in Gas-A is larger than 1/480.

2. The method of claim 1 further comprising injecting a Gas-D in the downstream of the plasma of Gas-C to treat the object comprising a surface in a downstream position of the Gas-D injection.

3. (Canceled)

5. (Amended) The method of claim 1, wherein Gas-B does not contain an oxygen atom.

9. The method of claim 2, wherein gas containing silicon as its element is used as Gas-D.

10. The method of claim 2, wherein gas containing carbon as its element is used as Gas-D.

11. The method of claim 2, wherein gas containing fluorine as its element is used as Gas-D.

21. The method of claim 1 wherein the method is provided to substantially prevent physical damage caused by a high energy particle.

23. (New) A method of surface treatment in a substantially downstream position of a plasma source, where an object to be processed is downstream from the plasma source, the method comprising generating a plasma discharge including a gas-C, the gas-C comprising a Gas-A molecule including essentially hydrogen as an

element and a Gas-B including essentially a halogen and a hydrogen bearing species; wherein said plasma discharge is substantially free from an oxygen bearing species; and wherein the Gas B is selected from at least a chlorine, bromine, iodine, or fluorine; wherein Gas C comprises a flow rate defined as a ratio of an amount of hydrogen in Gas-B to that in Gas-A is larger than 1/480.

24. (New) The method of claim 23 further comprising injecting a Gas-D in the downstream of the plasma of Gas-C to treat the object comprising a surface in a downstream position of the Gas-D injection.

25. (New) The method of claim 23 wherein Gas-B does not contain an oxygen atom.

26. (New) The method of claim 23 wherein gas containing silicon as its element is used as Gas-D.

27. (New) The method of claim 23 wherein gas containing carbon as its element is used as Gas-D.

28. (New) The method of claim 23 wherein gas containing fluorine as its element is used as Gas-D.

29. (New) The method of claim 23 wherein the method is provided to substantially prevent physical damage caused by a high energy particle.